[illegible], [illegible] G.V., inzh.; GETMAN[illegible], [illegible], inzh.

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[illegible], [illegible] 37 no.7:[illegible] Jl '61. ([illegible] 14:7)

[illegible] [illegible] institut ([illegible]).
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[illegible] sredstv (for Getmanskiy).
([illegible])
([illegible])

GETMANSKIY, I.K., inzh.; PANCHENKO, A.I.; ZALIOPO, M.N., inzh.; DONETSKAYA, L.M.

Liquid shampoo made from purified alkyl sulfates of secondary synthetic alcohols. Masl.-zhir. prom. 27 no.9:17-18 S '61. (MIRA 14:11)

1. Nauchno-issledovatel'skiy institut sinteticheskikh zhirozameniteley i moyushchikh sredstv (for Getmanskiy, Panchenko). 2. Fabrika "Svoboda" (for Zali[redacted] Donetskaya).
(Shampoo)

GETMANSKIY, I.K.; GRIBANOV, P.A.

Classification of the assortments of synthetic detergents. Trudy NIISZHIMSa no.3:91-94 '62. (MIRA 16:12)

GETMANSKIY, I.K.; VAGINA, I.K.; KUPRIYANOV, V.M.

Powdered "Molodost'" shampoo based on purified sodium alkyl sulfates of synthetic secondary alcohols. Trudy NIISZHIMSa no.3:95-96 '62.
(MIRA 16:12)

GOLUBEVA, S.K.; KURAYTIS, S.A.; GETMANSKIY, I.K.

Production of synthetic tanning materials based on phenol and nonsulfonated substances. Trudy NIISHZ MSa no.3:96-98 '62.
(MIRA 16:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut kozhevennoy promyshlennosti (for Golubeva, Kuraytis). 2. Nauchno-issledovatek'skiy institut sinteticheskikh zhirozameniteley i moyushchikh sredstv (for Getmanskiy).

KASPEROVICH, Ye.Ye., SHAKHROVA, N.F.; GETMANSKIY, I.K.

Methods for the design and calculation of an experimental spray-drying system for the production of detergents. Trudy NIIZHIMS. no.3:93-104 '62. (MIRA 16:12)

BELASH, F.N., prof.; PUGINA, O.V.; GETMANOVSKIY, I.K.

Flotation of iron oxides using a mixture of nonsulfonated compounds and tall oil. Gor. zhur. no.6:71-72 Je '62. (MIRA 15:11)

1. Krivorozhskiy gornorudnyy institut (for Belash, Pugina).
2. Shchebekinskiy nauchno-issledovatel'skiy institut sinteticheskikh zhirov i moyushchikh sredstv (for Getmanovskiy).

(Flotation) (Iron oxides)

APPROVED FOR RELEASE: 09/24/2001 CIA-RDP86-00513R000514930010-8"

GETMANSKIY, I.K., inzh.; KUPRIYANOV, V.M.; VAGINA, I.K.; LESHCHENKO, P.S., ~~inzh.~~; SKRYPINA, T.R.

"Astra" washing powder. Masl.-zhir.prom. 28 no.2:45-46 F '62. (MIRA 15:5)

1. Nauchno-issledovatel'skiy institut sinteticheskikh zhirozameniteley i moyushchikh sredstv (for Getmanskiy, Kupriyanov, Vagina). 2. Shebekinskiy kombinat sinteticheskikh zhirnykh kislot i zhirnykh spirtov (for Leshchenko, Skrypina).
(Shebekino—Washing powders)

AUTHOR: Gesmanskiy, P.V. 68-58-2-15/21

TITLE: Locking Device Signalization for the Loading of Coal Into Bunkers (Signalizatsiya blokirovki podachi uglya na silosy)

PERIODICAL: Koks i Khimiya, 1958, Nr 2, p 56 (USSR)

ABSTRACT: The author describes a system of light signaling used in the Zaporozh'ye Coke Oven Works for the loading of coal into bunkers. By means of this system, an exact order as to the bunker desired is given from the control panel, and a return signal is received when the order is fulfilled. By means of an intermediate relay, the operator at the control panel locks a feed belt into place and receives a signal when coal is delivered to the bunker. There is 1 figure.

ASSOCIATION: Zaporozhskiy koksokhimicheskiy zavod (Zaporozh'ye Coke Oven Works)

AVAILABLE: Library of Congress

Card 1/1

1. Coal - Handling 2. Signal lights - Control systems

GETMANSKIY, V. (Tula)

Income and expenditure balance should be the basis of turnover planning. Sov. torg. 34 no.9:24-25 S '61. (MIRA 14:9)
(Tula Province--Income) (Retail trade)

GETMANTSEV, G. G.

FA. 159T107

USSR/Radio - Wave Diffraction
Astrophysics

Apr 50

"Diffraction of Solar and Cosmic Radio Waves on the Moon," G. G. Getmantsev, V. L. Ginzburg, Physicotech Inst, Gor'kiy State U, 4 pp

"Zhur Eksper i Teoret Fiz" Vol XX, No 4

Discusses problem of diffraction of radio waves from the sun and cosmic objects by the moon from standpoint of possibility of localizing sources of these waves. Submitted 2 Dec 49.

159T107

GETMANTSEV, G.

Radioizlucheniye polyarnykh siyaniy na chastote 300 mgts. (Radiation of Aurorae Boreales on the 300 mgc). Uspekhi fizicheskikh nauk, 1950, v. 4 , no. 2, p. 332, 2 refs.

GETMANTSEV, G. G.

PA 192T10

USSR/Astronomy - Radio Emission Aug 51

"New Data Concerning the Emission of Radio Waves From the Sun and Galaxy," G. G. Getmantsev

"Uspekh Fiz Nauk" Vol XLIV, No 4, pp 527-557

In the past several years there have appeared several dozen new works devoted to one of the most interesting problems of astrophysics -- namely, radio wave emission from the Sun and Galaxy -- which are not discussed in 2 previous surveys by

192T10

USSR/Astronomy - Radio Emission (Contd) Aug 51

V. L. Ginzburg ("Uspekh Fiz Nauk" Vol XXXII, 26, 1947 and XXXIV, 13, 1948). The purpose of this article is to discuss the information contained in these new works. Bibliography of 58 references (43 non-Russian).

192T10

GETMANTSEV, G. G.

PA 234T99

USSR/Physics - Radio Hot Spots 1 Apr 52

"Cosmic Electrons as the Source of Radio-Wave Radiation in the Galaxy," G. G. Getmantsev, Phys-Tech Inst, Gor'kiy State U

"Dok Ak Nauk SSSR" Vol 83, No 4, pp 557-560

Staying within the generally accepted hypotheses concerning the sources of cosmic rays, the author attempts to clarify the frequency spectrum of radio-wave radiation of cosmic electrons in interstellar magnetic fields, Galactic radio noises, etc. Author attempts to compare

234T99

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the results obtained with present exptl data. Author acknowledges the helpful comments of Prof V. L. Ginzburg, who proposed this problem. Submitted 6 Feb 52 by Acad M. A. Leontovich.

(CA 47 no. 19: 9783 '53)
(PA 56 no. 668: 5273 '53)

234T99

~~GETMANTSEV, G. G.~~

APPROVED FOR RELEASE: 09/24/2001 CIA-RDP86-00513R000514930010-8"

GETMANTSEV, G. G.

PA 245T30

USSR/Astronomy - Radio Emission 11 Nov 52

"A Possible Mechanism of the Sun's Sporadic Radio Emission," G. G. Getmantsev and V. L. Ginzburg, Phys-Tech Inst, Gor'kiy State U

"Dok Ak Nauk SSSR" Vol 87, No 2, pp 187-190

State that the problem of the nature of subject emission has up till now remained unclear. Discuss unsatisfactory explanations of others. Relate subject emission to emission of relativistic electrons in the magnetic field of sunspots in analogy with the

245T30

mechanism to explain galactic radio emission. Thank S. A. Zhevakin. Submitted to Acad M. A. Leontovich 12 Sep 52.

245T30

GETMANTSER, G. G.

The Special Distribution of Primary Cosmic Ray Sources

The special distritution and the motion of cosmic relativistic electron sources in the interstellar magnetic fields are considered the cause of the nonthermal radio emission of the Galaxy. Analysis of data on a 3-meter wave revealed that the region containing the assumed cosmic ray sources forms a spheriod, flattened in a direction perpendicular to the Galactic plane. (RZhAstr, No. 9, 1955) Uch. Zap. Gorkovsk. un-ta, 27, 1954, 23-31

SO: Sum. No. 744, 8 Dec 55 - Supplementary Survey of Soviet Scientific Abstracts (17)

GETMANTSEV, G. G.

USSR/Astronomy - Cosmic radiation

Card 1/1 Pub. 8 - 3/13

Authors : Getmantsev, G. G.

Title : Galactic and meta-galactic components of cosmic radiation

Periodical : Astron. zhur. 32/1, 22-28, Jan-Feb 1954

Abstract : A study is presented of structural peculiarities of an 150-photogram of cosmic radiation observed at high galactic altitudes. The study resulted in the introduction of the metagalactic component, in addition to the galactic, into the cosmic radiation expression. Seventeen references: 7 USSR and 10 USA (1947-1953). Diagrams.

Institution : Gor'ky State University, Gor'kiy, Physical-Technical Institute

Submitted : April 8, 1954

GETMANTSEV, G. G.

USSR/ Physics Radio wave propagation

Card : 1/1 Pub. 118 - 7/7

Authors : Getmantsev, G. G., Zhevakin, S. A., Kobrin, M. M., and Miller, M. A.

Title : Propagation of radio waves

Periodical : Usp. fiz. nauk 53/2, 298 - 303, June 1954

Abstract : The book "Propagation of Radio Waves", written by V. N. Kessenikh, is criticized. Many fundamental errors in interpretation of the subject covered by the book were found. Also, the unmethodical arrangement of many experimental data, included in the book, render it useless even for reference. In short, the publication of the book by the "Gostekhizdat" (State Publ. House for Tech. Literature) is considered to be erroneous.

Institution : ....

Submitted : ....

GET'ANTSEV, G. G.

Nature of Nonthermal Cosmic Radio Emission
A book, Pamyati Aleksandra Aleksandrovicha Andronova (In Memory of Alexander Alexandrovich Andronov), published by Academy of Sciences USSR, pp 602-621, 1955.

The nonthermal radio emission of the Galaxy on 10-meter waves with an assumed temperature of 50,000 to 100,000 is explained by emission of relativistic electrons from the interstellar magnetic fields. The establishment of the type of spectrum at an energy over 1.5.10 ev requires observations below the 1.5 m. wavelength which are not available. The factors affecting the spectrum are particles emanating from cosmic ray sources, energy losses from radiative capture, collisions with protons, ionization, and energy acquired at collisions in magnetic clouds. (RZhAstr, No 11, 1955)

SO: Sum 812, 6 Feb 1956

GETMANTSEV, G.G.
Galactic and metagalactic components of cosmic radio emission.
Astron.zhur. 32 no.1:22-28 Ja-F '55. (MLRA 8:2)

1. Fiziko-technicheskiy institut Gor'kovskogo gosudarstvennogo universiteta.
(Radio astronomy)

GETMANTSEV, G. G.

NCV

GP

523.16 : 546.11.02 408

Monochromatic Radiation of Deuterium at a Wavelength of 91.6 cm from the Centre of the Galaxy.—G. G. Getmantsev, K. S. Stankevich & V. S. Troitski. ([illegible] U.R.S.S., 11th Aug. 1955, Vol. 103, No. 5, pp. 783-786. In Russian.) A brief report is presented of observations indicating the presence of deuterium in the interstellar space; the concentration is about 3×10^{-4} that of the non-ionised hydrogen. A block diagram is given of the equipment used in conjunction with a $\lambda/2$ dipole aerial at the focus of a 4-m-diameter parabolic reflector.

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Translation DSI Report # 83, Dec '55 - D457725

GETMANTSEV, G. G. , STANKEVICH, K. S. and TROITSKIY, V. S.

"Observation of Deuterium Lines in Absorption Lines on a Wavelength of 91.6 cm," a report delivered by P. M. Chikhachev at the Symposium on Radioastronomy held at the Jodrell-Bank Experimental Radioastronomical Station, Manchester University, England, is summarized in the account of this symposium in an article by V. V. VITKEVICH in Vest. Ak. Nauk SSSR for January 1956.

Sum. 900, 26 Apr 56

GETMANTSEV

Category : USSR/Radiophyiscs - Application of radiophysical methods I-12

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 2001

Author : Getmantsev, G.G.
Title : On the Nature of Non-Thermal Cosmic Radio Waves

Orig Pub : Tr. 5-go soveshchaniya po vopr. kosmogonii. 1955, M., AN SSSR, 1956, 468-493, diskus. 494-495

Abstract : See Ref. Zhur. Fiz., 1956, 4981

Card : 1/1

GETMANTSEV, G.G.

Category : USSR/Radiophysics - Application of radiophysical methods I-12

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2002

Author : Getmantsev, G.G., Razin, V.A.

Title : Concerning the Polarization of Non-Thermal Cosmic Radio Waves

Orig Pub : Tr 5-go soveshchaniya po vopr. kosmogonii. 1955, M., AN SSSR, 1956, 496-506, diskus. 506-507

Abstract : Radio waves produced by relativistic electrons are emitted in the direction of the motion of the electrons, and are almost linearly polarized in the plane tangent to the trajectory. Radiation from individual magnetized clouds (measuring approximately 10 parsecs) in the galaxy is linearly polarized, but by virtue of the random distribution of the clouds, the overall radiation may be partly polarized. After determining the distribution function for the degree of polarization ρ , the authors find that $\rho = 0.5\%$ and 1% respectively for an effective dimension of the galaxy R = 5000 parsecs and for a 10^{o} and 2^{o} antenna directivity-pattern spread 2θ. This is within the capabilities of present-day radio-astronomical apparatus. The ionized interstellar gas in a magnetic field, being a magnetically-active medium, will rotate the plane of polarization of the linearly-polarized waves that pass through it. The polarization of the radiation from a magnetized cloud will not be affected if the radio waves, radiated by the individual electrons emerging from the

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Category : USSR/Radiophysics - Application of radiophysical methods I-12

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2002

cloud, are polarized in nearby planes. This will occur if the electron concentration is low ($N_e \approx 6 \times 10^{-4}$ cm^{-3}), i.e., in regions far from the galactic plane. The rotating ability of the madium depends on the frequency, and consequently linearly-polarized radiation in a wide spectral interval becomes unpolarized. The observation of polarization therefore requires apparatus with a narrow pass band (approximately 0.1 Mc). As a result of the rotation of the plane of polarization, one must not expect a linear polarization of the radiation from discrete sources in the meter band, but such polarization should be observed in a region close to the optical one $\omega \approx 10^{16}$).

In the discussions, V.A. Udal'tsov (FIAN) reported an attempt to measure the polarigation of the radiation from the Crab Nebula at wavelengths of 7.6, 5.8, and 3.5 m. No polarization was observed within the limits of measurement accuracy.

Card : 2/2

GETMANTSEV

Category : USSR/Radiophysics - Application of radiophyiscal methods I-12

Abs Jour : Ref Zhur - Fizika, No 1, 1957 No 2007

Author : Getmantsev, G.G., Stankevich, K.S., Troitskiy, V.S.
Title : Monochromatic 91.6-cm Deuterium Radio Waves from the Center of the Galaxy.

Orig Pub : Tr. 5-go soveshchaniya po vopr. kosmogonii. 1955, M., AN SSSR, 1956, 539-545

Abstract : See Ref. Zhur. Fiz., 1956, 20669

Card : 1/1

GETMANTSEV, G.G.

USSR / Radio Physics. Application of Radio-Physics Methods. I-12

Abs Jour : Ref Zhur - Fizika No 3, 1957, No 7380

Author : Getmantsev, G.G., Razin, V.A.

Title : Concerning the Polarization of Non-Thermal Cosmic Radio Radiation.

Orig Pub : Byull. Vses. astron.-geod. o-va, 1956, No 19, 3-

Abstract : See Referat Zhurnal - Fizika, 1957, No 2

Card : 1/1

- 02 -

GETMANTSEV, G. G.

"About the Magnetobrems Mechanism of Nonthermal Cosmic Radioemission and Radioastronomical Methods for the Study of the Properties of Interstellar Medium,"

paper submitted for the Symposium on Radio Astronomy, 30 Jul - 6 Aug 58, Paris

Getmantsev, G.G.

SUBMITTED: December 7, 1957

SOV/109-3-3-22/23

AUTHORS: Golubkov, P.V. and Tsimring, Sh. Ye.

TITLE: The Second All-Union Conference on Radioelectronics of the Ministry of Higher Education of the USSR (Vtoraya vsesoyuznaya konferentsiya MVO SSSR po radioelektronike) - News Item

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 3, pp 440 - 444 (USSR)

ABSTRACT: The conference took place during September 23 - 29, 1957, at Saratovskiy gosudarstvennyy universitet imeni N.G. Chernyshevskogo (Saratov State University imeni N.G. Chernyshevskiy). Apart from the universities, the conference was attended by the representatives of some scientific research institutes of the Soviet and Ukrainian Academies of Science, various industrial establishments and the interested ministries. This arrangement stimulated the discussion and evaluation of the papers presented and permitted the determination of plans for the future research to be carried out by the universities in the field of radioelectronics.

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The paper by V.V. Zheleznyakov, in which the author suggested a hypothesis concerning the origin of the sporadic radiation of Jupiter, aroused a considerable interest and lively discussion. According to the hypothesis, the bursts of the radiation from Jupiter are due to the plasma oscillations in its ionosphere. The author found a close correspondence between the parameters of the ionosphere of Jupiter and those of the layer F_2 of the Earth ionosphere.

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The paper contained also a hypothesis dealing with the analogous mechanism of the recently discovered sporadic radiation of Venus. The work of G.G. Getmantsev entitled: "The Theory of Magnetic Braking Mechanism of the Non-thermal Cosmic radiowave Radiation" eliminates the theoretical difficulties which are encountered when an attempt is made to consider the galactic plane as being the source of cosmic electrons. The author considered that the electrons are formed as a result of non-elastic collisions between the relativistic protons of the inter-stellar medium. I.G. Moiseyev described a 10-cm radio telescope, having a mobile (vibrating) directional pattern. The movement of the pattern is secured by periodically switching the input of the receiver from one antenna radiator to another, the radiators being situated in the vicinity of the focus of a parabolic reflector. G.G. Getmantsev described a simple modulator (switch) which was constructed for the above equipment at the Gor'kiy University by N.N. Kholodilov and A.V. Zakharov. The Radiowave Propagation Section had ... papers and communications. The paper by B.N.Gershman

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entitled "The Theory of Large-scale Non-uniformities" proposed a theory analogous to that of the cellular Martin waves, which also took into account the effect of the magnetic field of the Earth. N.G. Denisov gave a theoretical analysis of the propagation of radiowaves through that region of the non-uniform magnetically-active plasma in which a partial absorption of the electromagnetic waves takes place due to the vicinity of the frequency of the external field and the natural frequency of the plasma. The author calculated the reflection coefficients and the propagation and absorption coefficients of the extraordinary wave for the transverse propagation and investigated the absorption of the ordinary and the extraordinary waves for the quasi-longitudinal propagation. The influence of the solar activity on the ionosphere was investigated in the papers by N.N.Yeryushev and N.A. Savich. [redacted]

GETMANTSEV, G.G.

Determining the average size of magnetized clouds of interstellar gas by radio astronomical methods. Izv.vys.ucheb.zav.; radiofiz. 1 no.3:158 '58. (MIRA 12:1)

1. Issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete.

(Radio astronomy)

4

3,1)

AUTHOR: Getmantsev, G. G. SOV/33-35-5-5/20

TITLE: On Some Peculiarities of the Magnetodecelerating Mechanism of Non-Thermal Radio Emission (O nekotorykh osobennostyakh magnitno-tormoznogo mekhanizma neteplovogo kosmicheskogo radioizlucheniya)

PERIODICAL: Astronomicheskiy zhurnal, 1958, Vol 35, Nr 5, pp 722-729 (USSR)

ABSTRACT: The author joins several publications of Professor V.L.Ginzburg and thanks Ginzburg for the revision of the manuscript. He shows that if cosmic electrons which cause non-thermal cosmic radio emission are supplied to the periphery of the Galaxy by sources concentrated in the galactic plane, then the adiabatic invariant is not conserved when the particles move in an interstellar magnetic field. He discusses the possibility of formation of relativistic electrons as a result of nonreversible collisions of relativistic protons with atoms of the interstellar medium, which is proposed in [Ref 7].
There are 8 Soviet references.

ASSOCIATION: Radiofizicheskiy institut pri Gor'kovskom universitete imeni N.I.Lobachevskogo (Radiophysical Institute at the Gor'kiy University imeni N.I.Lobachevskiy)

SUBMITTED: September 6, 1957

Card 1/1

SOV/53-66-2-1/3

AUTHORS: Getmantsev, G. G., Ginzburg, V. L., Shklovskiy, I. S.

TITLE: Radioastronomical Investigations With the Aid of Artificial Earth Satellites (Radioastronomicheskiye issledovaniya s pomoshch'yu iskusstvennykh sputnikov Zemli)

PERIODICAL: Uspekhi fizicheskikh nauk, 1958, Vol 66, Nr 2, pp 157-161 (USSR)

ABSTRACT: Artificial satellites are of great importance for optical- as well as for radio-astronomy; they may serve as receiving stations for near- and far ultraviolet-, X-ray- and far infrared radiation which, because of absorption in the atmosphere, does not reach the surface of the earth, as well as for the r.f.-range where absorption in the troposphere and refraction and absorption in the ionosphere act upon radiation. The authors first discuss absorption in the troposphere (especially in the $\lambda < 2$ cm range), connection with the effective temperature of the radiation source, solar and lunar radiation, the influence exercised by the ionosphere, and several problems of a general nature; discussion is based upon scientific publications mentioned

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(Refs 1-8). The conditions for a receiving apparatus for the range 10 cm $< \lambda <$ 10 m are then discussed ($T_{eff} = a\lambda^{2.8}$, intensity $I_\nu = \frac{2kT_{eff}}{2} \sim \lambda^{0.8}$; with $\lambda \sim 3$ m, T_{eff} is of the order of 10^3 degrees, at 30 cm $< \lambda <$ 100 m $T_{eff} \sim 10^6$ to 10^7 degrees, $I_\nu \cong$ const; $\lambda >$ 100 m: $T_{eff} \gg 10^7$ degrees). The authors further discuss radio-receiving apparatus. For $\lambda >$ 100 m very low limiting values of the noise factor ($F_n \sim 2$) are obtained for coincidence superheterodyne receiving sets. For large λ wire antennae of several 10 m length would be necessary; as this is impossible in a Sputnik, frame antennae with ferrite core are used, which can be of very small dimensions ($\ell \sim 10$ cm, weight 300 g). The axis of the frame is parallel to the metal surface of the Sputnik. Because of a Sputnik's own rotary motion also the position of the frame is modified which causes fluctuations of the intensity of reception. It is therefore necessary to know the orientation of the frame at every instant. The antenna will not receive a radiation for which it holds that $\varepsilon(r,H) = 0$ at the place of reception. If the magnetic terrestrial field is

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Radioastronomical Investigations With the Aid of Artificial Earth Satellites

neglected, it holds that

$$\varepsilon(f) = 1 - \frac{4\pi e^2 N}{m(2\pi f)^2} = 1 - 8.10^7 \frac{N}{f^2}$$

Here N is the electron concentration, f - the frequency of the radiation received. In interplanetary space $N \sim 1$ to 5.10^2, $\varepsilon(f) > 0$, $f > f_o = 9.10^4 - 2.10^5$ or $\lambda = c/f < \lambda_o = 1.5$ to 3 km. When measuring f_o it is possible to calculate N according to the aforementioned formula. The influence exercised by the terrestrial field complicates investigation, but this influence is not very considerable for relatively fast Sputniks. There are 11 references, 4 of which are Soviet.

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06329
SOV/141-2-1-1/19

AUTHOR: Getmantsev, G. G.

TITLE: On Nonthermal Cosmic Radio Emission

PERIODICAL: Izvestiya vysshikh uchebnykh zavedaniy, Radiofizika, 19.., Vol 2, Nr 1, pp 3-7 (USSR)

ABSTRACT: An attempt is made to explain the origin of both the spherical and the plane components of the nonthermal cosmic radio emission, assuming that the radio emission is due to cosmic electrons moving in the interstellar magnetic field. New radio astronomical data are used as the basis of the analysis. Cosmic radio emission is usually divided into two components. The sources of the first component form a quasi-spherical galactic corona and are known to be nonthermal. The second (plane) component is characterized by a high degree of concentration of the radio emission towards the galactic equator. Until quite recently, the plane component was thought to have a thermal origin. It was assumed that the plane component is due to thermal radio emission by clouds of interstellar ionized gas concentrated towards the galactic plane. However, measurements carried out by Mills (Ref 1) and Shain (Ref 2) with high angular resolution do not confirm this hypothesis and show that the plane component has a nonthermal

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On Nonthermal Cosmic Radio Emission

origin, at least for $\lambda > 1$ m. In order to interpret this important discovery it is assumed by the present author that in the galactic corona (Region I) the relativistic electrons which are the source of cosmic rays are concentrated in the region of the galactic plane (Region II). NV_2 relativistic electrons are born per unit time in Region II where V_2 is the volume of this region. If the electrons generated in Region II remain in this region during a time Δt and then leave it and pass on to Region I, the concentration of emitting particles in Region II is $n_2 = N\Delta t$. The loss of relativistic electrons per unit time from Region I due to inelastic nuclear collisions is $n_1 V_1/T$ where n_1 is the concentration of the emitting electrons in Region I, V_1 is the volume of this region and T is the "lifetime" of the cosmic particles. In the stationary state $n_1 V_1/T = NV_2$ or $n_1 = NV_2/V_1T$ and the ratio of the concentrations of

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On Nonthermal Cosmic Radio Emission

relativistic electrons in Regions II and I is $n_2/n_1 = (V_1/V_2) \times (\Delta t/T)$. The intensity of the cosmic radiation I_ν , due to the above mechanism is known (Refs 7, 8) to be proportional to $nH_\perp^2$ where $H_\perp = H \sin \theta$ and is the component of the interstellar field $H_\perp$ perpendicular to the particle velocity. According to the radio astronomical data reported by Mills (Ref 1), for wavelengths in the metre range $I_{\nu 2}$ is several times greater than $I_{\nu 1}$ and the ratio $I_{\nu 2}/I_{\nu 1}$ is different for different parts of the galactic equator. Assuming that on the average $I_{\nu 2}/I_{\nu 1} \approx 5$ we find that $(n_2/n_1)(H_{\perp 2}/H_{\perp 1})^2 \approx 5$. Since the interstellar magnetic field is associated with the ionized gas which is strongly concentrated towards the galactic plane, one would expect that $H_2/H_1 > 1$. This supposition is supported by the presence of regularities in the directions of the magnetic field in spiral galactic arms. The very fact of the presence of such arms indicates that the interstellar field

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On Nonthermal Cosmic Radio Emission

has an important effect on the structure of the interstellar medium in Region II. Furthermore, the absolute value of the concentration of relativistic electrons with energies greater than or approximately equal to 10^9 eV in the region of the galactic plane, which is necessary if one is to explain the observed radio emission in the plane component, should be of the order of 5×10^{-12} e/cm^3 (for $H \approx 10^{-5}$ oersted). This exceeds the upper limit of the concentration of primary cosmic electrons at the Earth ($n_2 < 10^{-12}$ e/cm^3). The contradiction may be avoided by assuming that H_2 is several times greater than 10^{-5} oersted. On the other hand, $H = H_1 = 10^{-5}$ oersted is very probably the upper limit for the intensity of the magnetic field in the galactic corona. If one assumes that $H_2/H_1 = 5$ (somewhat arbitrarily), and takes into account the fact that $\sin^2\theta/H = \text{const}$, one finds

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SOV/141-2-1-1/19

On Nonthermal Cosmic Radio Emission

that $(H_{\perp 2}/H_{\perp 1})^2 = 125$. Since $I_{\nu 2}/I_{\nu 1} = (n_2/n_1)(H_{\perp 2}/H_{\perp 1})^2$ one finds that:

$n_2/n_1 = (V_1/V_2)\Delta t/T \approx 1/30$. Thus the concentration of relativistic electrons in the region of the galactic plane n_2 should be considerably smaller than the corresponding value n_1 for the galactic corona in spite of the fact that $I_{\nu 2}/I_{\nu 1} > 1$. Thus, if the intensity of the magnetic field in the region of the galactic plane is several times greater than the intensity in the corona, then the concentration of relativistic electrons in Region II should be several times smaller than in the galactic corona. Since this result depends essentially on the kinematics of the motion of cosmic rays in the interstellar magnetic field, it follows that this should also be the case for relativistic protons and other heavier cosmic particles. The concentration of cosmic particles (mainly protons) with energies greater than or equal to 10^9eV in primary cosmic rays at the Earth is of the order of $10^{-10}cm^{-3}$ and the corresponding energy density is of the order of

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On Nonthermal Cosmic Radio Emission

10^{-12} erg/cm^3 . On the other hand, the kinetic energy density of macroscopic turbulent motion of interstellar gas in the galactic corona $(\rho v^2/2)$ is of the same order as the magnetic energy density $(H_1^2/8\pi)$ for $H_1 \sim 10^{-5}$ oersted, i.e. 10^{-11} erg/cm^3 . This is by one order of magnitude greater than the energy density associated with cosmic rays at the Earth. The increase in the concentration of cosmic rays during the transition from the galactic plane to the corona (by a factor of several tens) means that the energy of the cosmic rays in the corona can be comparable with the energy of macroscopic motion of magnetized masses of ionized gas in the galactic corona. In this case, cosmic rays should have an important effect on the structure and motion of gas in Region I and may be one of the most important factors governing the existence of the galactic corona. It is argued that the discrepancy which exists between the values for the average linear dimensions of magnetized clouds of interstellar gas obtained from fluctuations of the intensity of cosmic radio emission and the value obtained from polarization measurements, indicates the presence of a regularity

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in the distribution of the directions of the interstellar magnetic field in the galactic corona which tends to increase the degree of polarization. It is suggested that polarization measurements should be carried out with decimetre waves so that the depolarization of radio emission in the interstellar magneto-active medium need not be taken into account. Acknowledgment is made to V. L. Ginzburg for valuable suggestions. There are 12 references, of which 7 are Soviet, 4 are English and 1 is German.

ASSOCIATION: Issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Research Radio-Physical Institute of Gor'kiy University)

SUBMITTED: July 17, 1958.

Card

4

3(1) SOV/33-36-3-4/29

AUTHOR: Getmantsev, G.G.

TITLE: The Determination of the Mean Dimensions of Magnetized Clouds of Interstellar Gas by Methods of Radio Astronomy

PERIODICAL: Astronomicheskiy zhurnal, 1959, Vol 36, Nr 3, pp 422-426 (USSR)

ABSTRACT: The author discusses two possibilities to determine the mean dimensions l of magnetized clouds of interstellar gas. The first method bases on the measurement of the polarization of the non-thermal radio emission. Considering here the correlation of the planes of polarization then one obtains the trivial assertion $l < 200$ ps. The second method bases on the measurement of the fluctuations of intensity of the non-thermal radio emission, when the directional diagram of the radio telescope is swept across the celestial sphere. Basing on measurements of Mills and Slee [Ref 5] the author obtains after a consideration of certain interference factors $l \gtrsim 75$ ps. The author thanks V.L. Ginzburg for remarks.
There are 5 references, 4 of which are Soviet, and 1 Australian.

ASSOCIATION: Radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete imeni N.I. Lobachevskogo (Radiophysical Institute at the Gor'kiy State University imeni N.I. Lobachevskiy)

SUBMITTED: March 6, 1958 (initially)
March 6, 1959 (after revision)

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SOV/56-37-3-37/62

AUTHOR: Getmantsev, G. G.

TITLE: On the Build-up of Electromagnetic Waves in Interpenetrating, Infinite Moving Media

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3(9), pp 843-846 (USSR)

ABSTRACT: The increasing plane waves with a longitudinal electric field in the motion of an electron stream in a plasma were investigated especially by A. I. Akhiyezer and Ya. B. Faynberg (Ref 1), V. L. Ginzburg and V. V. Zheleznyakov (Ref 2). The present paper reports on a phenomenological method by which the problem of the decrement of the increase (or attenuation) of electromagnetic waves in moving media may be solved under certain, sufficiently general conditions. The author assumes 2 infinite, homogeneous, nonabsorbing, and nonmagnetic media I and II. Medium II is at rest in the Cartesian laboratory system K and has the dielectric constant ϵ_2. Medium I (dielectric constant ϵ_1) is connected with the coordinate system K' which moves uniformly along the x-axis of the coordinate system K at the velocity v. If ϵ_1 and ϵ_2 do not differ too greatly from the value 1, or if a motion

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On the Build-up of Electromagnetic Waves in Interpenetrating, Infinite Moving Media

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of a plasma in a plasma is concerned, the real electric field is equal to the mean macroscopic field, and the polarization vectors of the media I and II are summed up. The material equations connecting the vectors of the electromagnetic field $\vec{D}$, $\vec{E}$, $\vec{B}$, $\vec{H}$ have the following form in the coordinate system K:

$$\vec{D} = \frac{1}{(1-\varepsilon_1\beta^2)}\left\{\varepsilon_1(1-\beta^2)\vec{E} + (\varepsilon_1 - 1)\left(\left[\frac{\vec{v}}{c}\vec{H}\right] - \varepsilon_1\frac{\vec{v}}{c}\left(\frac{\vec{v}}{c}\vec{E}\right)\right)\right\} + (\varepsilon_2 - 1)\vec{E}$$

$$\vec{B} = \frac{1}{(1-\varepsilon_1\beta^2)}\left\{(1-\beta^2)\vec{H} - (\varepsilon_1 - 1)\left(\left[\frac{\vec{v}}{c}\vec{E}\right] + \frac{\vec{v}}{c}\left(\frac{\vec{v}}{c}\vec{H}\right)\right)\right\}, \quad \beta = \frac{\vec{v}}{c}$$

By means of this equation and by the Maxwell equation the author then solves the problem of the propagation of plane electromagnetic waves in the media I and II. After some operations an equation for the refractive indices is obtained. At given frequency and known dielectric constants $\varepsilon_1(\omega)$ and $\varepsilon_2(\omega)$,

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On the Build-up of Electromagnetic Waves in Interpenetrating, Infinite Moving Media

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these two equations define the propagation velocities of the electromagnetic waves in 2 media, one of which is moving. Their solution determines especially the "coefficient of increase" of the electromagnetic wave of the moving medium. In a plasma moving at non-relativistic velocity there is no "increase" of the wave in explicit form. A plasma is the example of a medium in which dispersion leads to the occurrence or apparent disappearance of the increase according to the reference system chosen for the computation of ε. The author computes as an example the initially posed problem for the case in which an infinite and homogeneous plasma moves in a non-dispersing medium with the dielectric constant ε_2. The author thanks A. V. Gaponov and V. V. Zheleznyakov for useful advice and discussions. There are 5 Soviet references.

ASSOCIATION: Radiofizicheskiy institut Gor'kovskogo gosudarstvennogo universiteta (Radiophysical Institute of Gor'kiy State University)

SUBMITTED: April 27, 1959

Card 3/3

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B006/B056

AUTHORS: Getmantsev, G. G., Rapoport, V. O.

TITLE: The Build-up of the Electromagnetic Waves in a Plasma Moving in a Dispersion-free Dielectric in the Presence of a Constant Magnetic Field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 4, pp. 1205 - 1211

TEXT: The present paper describes a theoretical investigation of the propagation of electromagnetic waves in a plasma, and especially, a determination of the build-up (damping) factor for plane electromagnetic waves propagating in a plasma moving in a dielectric without dispersion along the lines of force of a constant homogeneous magnetic field. The damping factors of the waves are found according to a phenomenological method suggested earlier (Ref. 2) by Getmantsev. The method consists essentially in first setting up equations of matter which establish a connection between the electric fields in the moved media penetrating one another. These equations are combined with the Maxwell equations. With

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The Build-up of the Electromagnetic Waves in a Plasma Moving in a Dispersion-free Dielectric in the Presence of a Constant Magnetic Field

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f(,k) = 0 the damping factors are found by means of solving the dispersion equation (4). The dispersion equation is derived for the case in which both the moved medium (I) and the medium at rest (II) are assumed to be non-magnetic, anisotropic, and gyrotropic. The electric properties of medium II, at rest in the laboratory system, are characterized by the ε_{ik}-tensor. Let medium I be assumed to move uniformly and rectilinearly along the x-axis relative to II with the velocity v, so that x, x', and H coincide. (The systems of reference of I and II are denoted by K' and K, so that all quantities marked by a prime refer to the moved medium). As both systems are assumed to be gyrotropic, the tensors $'_{ij}$ and $_{ij}$ are hermitean. The damping factors (and build-up factors) are obtained as functions of time for a moved diluted plasma, viz. for the case of strong and weak perturbation. The authors finally thank V. V. Zheleznyakov for discussing the results. There are 6 references: 5 Soviet and 1 US.

ASSOCIATION: Radiofizicheskiy institut Gor'kovskogo gosudarstvennogo universiteta (Institute of Radio Physics of Gor'kiy State University)

SUBMITTED: October 20, 1959

Card 2/2

GITMANT... G. G.

P/048/61/000/003/001/004
1004/1204

AUTHORS Bieniediktow, J. A., Gittmancew, G. G., Ginzburg, W. L.

TITLE Radioastronomical investigations with the aid of artificial satellites and cosmic rockets

PERIODICAL Astronautyka no 3, 1961, 5-8

TEXT Radioastronomical observations by satellites can expand the range of wave lengths at which extra terrestrial signals can be received above 20-40 m and below 1 cm. Measurements of the microwave sepctrum of the sun may reveal that the drop in its effective temperature is caused by the fact that the radiation passes through an inverse layer whose temperature is probably lower than that of the photosphere Radiation of the moon in the millimeter range and below may furnish information about the structure and electric and thermal properties of the moon's soil. Rockets which will pass in the vicinity of Mars, Venus, and other planets may carry out measurements of electromagnetic radiation from these planets over a wide frequency range Sporadic eruptions of the sun which are closely related to magnetic storms, ionospheric disturbances affecting short wave radio communication, and other phenomena can be observed more clearly from satellites Investigation of the sporadic eruptions of Jupiter below 14 Mc may reveal their cause

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E0[illegible]

AUTHORS: [illegible]ktor, Ye.A., Getmant'se[illegible]

Ginzburg, V.L.

TITLE: Radio-astronomical studies using [illegible] satellites and space rockets

PERIODICAL: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli, No.7, Moscow, 1961, pp. 3-22

TEXT: In a previous paper (Ref. [illegible] Ginzburg, I.S. Shklovskiy, UFN, 66, 15[illegible] 1958) [illegible] applications of artificial Earth sat[illegible] discussed. The present paper extends [illegible] particular attention to fundamental [illegible] discussions of specific forms of ap[illegible] into the following sections: 1) [illegible] 2) measurements of sporadic radio em[illegible] 3) cosmic radio emission and the rad[illegible] sources, 4) radio emission in the ra[illegible] the planets. 5) studies of the ion[illegible] medium. The first part of this paper [illegible] $\lambda < 1-3$ cm. The high-frequency radi[illegible]

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moon can be investigated with the ai[illegible]
while the observation of this emi[illegible]
millimeter wavelengths is of great [illegible] solar
strongly absorbed in the troposph[illegible]
emission on these wavelengths sh[illegible]
effective temperature of the sun sh[illegible]
while that of the moon should be ~ [illegible]
include the synchrotron emission d[illegible]
circulating in solar magnetic fields. [illegible]
spectrum of the sun it may be poss[illegible]
the effective temperature on wavelen[illegible]
passage of the radiation through [illegible] the [illegible]
temperature is apparently lower than [illegible] artificial earth [illegible]
The apparatus which should be set up [illegible] and lunar [illegible]
in order to measure the high-frequen[illegible]
emission need not differ to any great [illegible]
'surface' apparatus. The linear dime[illegible]
(mirrors) need not be very large since [illegible] example [illegible]
moon and the sun are of the order of [illegible]
λ = 0.1 cm the mirror diameter turns [illegible]
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The flux of solar and lunar radio emission can only be measured with antennas having high directivity which would require "oriented" satellites. In the case of space rockets launched so that they reach the neighbourhood of Mars, Venus and other planets in the solar system, the radio measurements can be carried out in a wide frequency range. C.H. Mayer, T.P. McCullough and R.M. Sloanaker (Ref.5: Proc. IRE, V.46, 260, 1958) and L.E. Alsop, Y.A. Giorgmaine, C.H. Mayer and C.H. Townes (Ref.7: Paris Symposium on Radio Astronomy, Stanford, California, 1959) have already measured the radio emission of Venus and Mars on centimetre waves using a radio telescope with a parabolic mirror 15 m in diameter. On $\lambda = 3.15$ cm the effective temperature of Mars was found to be 220 ± 75 °K, while for Venus the corresponding figure is 600 °K. These measurements represent the present limit of radio astronomical apparatus. On the other hand attempts to extend these measurements to longer decimetre waves, or even metre waves, will meet with serious difficulties. In fact, since the emission of Mars and Venus in this range is of thermal character its intensity should be proportional to λ^{-2}, and hence in order to achieve the same power at the output of the antenna as in the case

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of the shorter wavelengths the area of the antenna must be increased in proportion to λ^2. A mirror having a diameter of about 150 m is already necessary at $\lambda = 1$ m. In the case of a space rocket, on the other hand, the antenna dimensions can be reduced very considerably, e.g. down to $l \sim \lambda$. The sporadic solar radio emission has been extensively studied in a wide wavelength range beginning at a few cm right up to $\lambda \sim 10$ m. It has been established that the slowly varying (in time) component is associated with sunspots. The other component of the sporadic radio emission takes the form of short bursts. These are due to the radio emission which is largely associated with solar corpuscular streams and also solar cosmic rays emitted from chromospheric flares. The study of the spectral characteristics of these bursts, and also the time dependence of the intensity, is of major importance to any detailed theory of the sporadic radio emission of the sun. The sporadic solar radio emission is also of great interest from the geophysical point of view. The corpuscular streams which are responsible for these bursts are also responsible for geomagnetic disturbances, radio fadeout on short waves, ionospheric disturbances, etc. A consideration of the experimental

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material available so far shows that in the case of $\lambda \gtrsim 40-50$ m; the study of solar radio bursts can only be carried out with the aid of artificial Earth satellites with orbits lying above the F layer maximum. Satellites will also be used for λ ... m. Presently available data (C.W. Allen, Astrophysical Quantities, London, Athlone Press, 1955, Ref.15, and D.E. ... 1, Monthly Not. Roy. Astr. Soc., V.116, 56, 1956, Ref.16) suggest that the radio bursts on $\lambda \lesssim 40$ m should be generated at relatively low heights in the corona, namely $R/R_E \lesssim 2.1$. On the other hand the regular solar corona is known to extend at least to $R/R_E \sim 10-20$ and possibly to even greater distances. It may therefore be expected that the burst component of the sporadic solar radio emission should be observable up to $\lambda \sim 100-400$ m. Thus any information on bursts on wavelength in excess of 20 m would be of considerable interest from the point of view of the physics of the outer solar corona. Satellite apparatus designed to record solar bursts could also be used to detect the bursts due to Jupiter. Particularly interesting information about the latter bursts would correspond to the wavelength range below 30 m. As regards the cosmic radio emission and the radio emission of discrete sources, it is pointed out that presently available data suggest that measurements of the spectrum of the non-thermal cosmic radio emission on $\lambda \gtrsim 30$ m obtained with the aid of artificial earth satellites should lead to more accurate information on the gas concentration in inter-planetary space for known magnetic fields H. Conversely, these measurements should lead to more accurate values for H if the gas concentration can be determined independently. Accurate satellite measurements of the spectrum of the non-thermal cosmic radio emission should be carried out from high orbits so as to minimise ionospheric effects. Recent rocket and satellite measurements show that the electron concentration above the F-layer decreases with altitude rather slowly (Ya.L. Al'pert, F.F. Dobryakova, E.F. Chudesenko, B.S. Shapiro, UFN, V.65, 161, 1958, Ref.27). It is estimated that in order to minimise ionospheric effects, the measurements of extra-terrestrial radio emission on wavelengths greater than 1 m should be carried out from satellites having an apogee in excess of 1000 km. Inter-planetary absorption of radio waves may become important in satellite measurements. Table [illegible] gives the estimated absorption in inter-planetary space for 100, 1, and 0.01 electron/

cm^3 where ℓ is the path length in cm. The optical thickness τ given in Table 2 was calculated from a formula given by V.P. Ginzburg (Ref.28: "Propagation of Electromagnetic Waves in Plasma", Fizmatgiz, 1960). This formula reads:

$$\tau = \frac{10^{-2} \cdot N}{Te^{3/2} \cdot f^2} \left[17.7 + \ln \frac{T_e^{3/2}}{f} \right] \cdot \ell \qquad (1)$$

and holds for rarefied plasma for which $(n - 1) \ll 1$. The values given in Table 2 are very approximate but nevertheless it is to be expected that the absorption should become appreciable beginning with $\lambda \sim 500$-1000 m. Another interfering effect in the range $\lambda \gtrsim 200$-300 m may be due to corpuscular streams. A consideration of available satellite and rocket data (Ref.1: as above. Ref.2: F.T. Haddock, Amer. Rocket Soc. No.794, 1959. Ref.3: A.C.B.Lovell, Proc. Roy.Soc. A253, 494, 1959. Ref.4: J.P.I. Tyas, C.A.Franklin, A.R. Molozzi, Nature, 184, 785, 1959) suggest that the satellite antennas should be of a simple form. It is estimated that there should be no intensity difficulties and antenna dimensions of the order of a few metres should be sufficient. As regards the radio

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emission of discrete sources the wavelength range 20-50 m is of particular interest since it is inaccessible to terrestrial measurements. Here antennas having linear dimensions of the order of the wavelength are estimated to be adequate. In order to achieve angular localization of discrete sources and to determine the details in the distribution of non-thermal cosmic radio emission, one could use the diffraction of extra-terrestrial radio emission by the moon and the earth. Estimates of the radio emission of terrestrial and planetary radiation belts are more difficult. Nevertheless, very rough calculations indicate that the intensities involved should be detectable from artificial earth satellites, and it is precisely because these estimates are difficult that the satellite experiments should be carried out. Finally, satellite and rocket measurements can produce information about the radio emission of the terrestrial and planetary atmospheres and also about the inter-planetary medium. It is suggested that the most promising method of measuring the electron concentration in the ionosphere and in inter-planetary space is the method involving the measurement of the group delay time of audio-frequency modulated signals transmitted from artificial earth

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Radio-astronomical studies using S/560/61/000/007/001/010
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satellites (E.Ye. Gershman, N.A. Mityakov and V.O. Rapoport, Ref.37: Izv. vuz, Radiofizika, Vol.3, 949, 1960). It is suggested that a review of available information indicates that the above radio-astronomical observations can be carried out with relatively simple apparatus (this refers to the radio apparatus and the antennas). The authors therefore expect that satellite and rocket radio-astronomical observations will attract considerable attention in the near future.

There are 1 figure, 2 tables and 39 references: 19 Soviet and 20 English. The four most recent English language references read:

Ref.3: as above.

Ref.10: A.R. Tompson, A. Maxwell, Nature, 185, 89, 1960.

Ref.31: J. Van Allen, Nature, 183, 430, 1959.

Ref.39: A.G. Smith, T.D. Carr, H. Bollhagen, N. Chatterton and F. Six. Nature, 187, 568, 1960.

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27610
S/141/61/004/002/002/017
E032/E114

3,1700

AUTHORS: Benediktov, Ye A., and Getmantsev, G G.

TITLE: Sporadic low frequency solar radio emission

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika 1961 Vol.4, No.2 pp 244-252

TEXT: Sporadic solar radio emission is said to be clearly defined in the metre range. However, the sporadic radio emission emitted on lower frequencies is also of great interest and has been investigated by a number of authors: (C. Warwick and J.W. Warwick. Paris Symposium on Radio Astronomy, Stanford Univ. Press, 1959, p.203, Ref.1; R. Fleischer Paris Symposium on Radio Astronomy, Stanford Univ. Press, 1959, p.208, Ref.2; H. Daene, Mitt. Astrophys. Observ. Potsdam 301, 1 (1959), Ref.3; and A. Boischot, R.H. Lee, J.W. Warwick, Astroph. J. Vol.131, 61 (1960), Ref.4). The present paper reports some results of observations of solar radio bursts on 25, 18, 13 and 10.5 Mc/s. The observations were carried out during the summer months of 1959 and 1960. The radio bursts were recorded as a side effect with an apparatus designed for the observation of galactic radio

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Sporadic low frequency solar radio .. E032/E114

emission below 30 Mc/s. In the case of the 25 18 and 13 Mc/s observations, the antenna systems consisted of multidipole cophased arrays at a height of $\lambda/4$ above metal ground. The radiation patterns of these antennas were identical and the width of the major lobe at half-power points was 30° x 30°. In the case of the 10.5 Mc/s signals the radiation was detected with the aid of a horizontal rhombic antenna or by means of a half-wave dipole. Standard receivers with an intermediate frequency bandwidth of 3 kc/s were used. It was found that the number of solar radio bursts was relatively large. More than 60 cases of solar activity at 25 and 18 Mc/s were noted in August 1959. About 40 bursts and groups of bursts on 13 Mc/s were noted in the summer of 1960. Moreover, a number of bursts on 10.5 Mc/s were noted during July/August 1960. The intensity of the bursts was frequently very high although an absolute estimate of the intensity was only possible in the case of the 10.5 Mc/s observations. Assuming that the effective temperature of the galactic background on this frequency is a few hundred thousand degrees, then the flux density from many of these bursts reached 10^{-19} w m^{-2} cps^{-1}, i.e. the effective

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Sporadic low frequency solar radio... E032/E114

temperature of the sun over the entire disc during these bursts was greater than 10^{11} deg. It was noted that strong low-frequency bursts are relatively rarely accompanied by bursts on higher frequencies. For example, of the 17 bursts noted on 13 Mc/s in August 1960, only 3 were simultaneous with bursts on higher frequencies. The duration of single bursts is not very large (of the order of minutes). Occasionally, series of bursts are observed, as for example on August 30 1959 (Fig.1). In this figure the traces marked a, b and c (a, б and в) correspond to 25, 18 and 10.5 Mc/s (the time is local Moscow time). There is some evidence that solar bursts on even lower frequencies are also present. Since recording of sporadic solar radio emission below 8-10 Mc/s is practically impossible owing to the screening by the ionosphere, observations obtained with the aid of artificial earth satellites are of particular importance. The latter are described by the present authors and V.L. Ginzburg in Ref.7 (Iskusstvennyye sputniki Zemli (to be published)).
There are 5 figures, 4 tables and 7 references: 3 Soviet and 4 non-Soviet. The three English language references are quoted in the text above.
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S/141/61/004/002/002/017
Sporadic low frequency solar radio E032/E114

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Institute of Radiophysics at the Gor'kiy State University)

SUBMITTED: November 24, 1960

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33200
S/141/61/004/005/002/021
E032/E514

9,9130

AUTHORS: Artem'yeva, G.M., Benediktov, Ye.A. and Getmantsev, G.G.

TITLE: On the relation between sporadic solar radio emission and the state of the ionosphere

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v.4, no.5, 1961, 831-848

TEXT: Geophysical phenomena which are associated with chromospheric flares, bursts of radio emission and other manifestations of solar activity may be classified into three groups. The first group contains events which occur practically simultaneously with the onset of a flare or a radio burst. Effects belonging to this group are due to the short wavelength ionizing radiation originating on the sun. An example of this type of phenomenon is the sudden increase in the radiowave absorption in the ionosphere due to ionization by solar UV radiation associated with solar flares. The second group includes phenomena which are delayed relative to the onset of flares and radio bursts and are associated with solar corpuscular streams. Here the delay is of the order of a day as compared with less than 30 min in the case of the first

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On the relation between sporadic S/141/61/004/005/002/021
E032/E514

group The second group includes magnetic disturbances auroras and a number of other effects It has also been established that in addition to the fast (sporadic) variations the geomagnetic field and the ionospheric parameters are subject to slow changes associated with the general level of solar activity both in the optical and in the radio ranges This type of slow variation which can be correlated with the level of solar activity belongs to the third group of phenomena The present authors review the relation between sporadic radio emission of the sun and the state of the ionosphere on the basis of published data and measurements which were carried out at NIRFI during 1958 and 1959 The review is given under the following headings:

1) Relation between solar flares, radio bursts and geophysical phenomena due to the short wavelength ionizing solar radiation

2) Relation between solar flares, radio bursts and the geophysical phenomena due to corpuscular streams.

3) Long-period variations in the state of the ionosphere and solar radio emission

It is shown that fade-out and other ionospheric phenomena in the first group are better correlated with bursts of sporadic radio

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On the relation between sporadic S/141/61/004/005/002/0?? E032/E514

emission on high frequencies than with bursts of low frequencies this has been confirmed by the work of M R Kundu (Ref 7 J Geophys Res 65 3903 1960) and also the radio-astronomical and ionospheric observations carried out at NIRFI in 1959 There is considerable evidence suggesting that bursts of solar radio emission on low frequencies are associated with ionospheric and magnetic disturbances due to the entry of solar corpuscular streams into the Earth s atmosphere The use of solar radio emission as an index of solar activity for the purposes of long-range forecasting of the critical frequencies of ionospheric layers does not appear to have any special advantages as compared with the optical index of solar activity A possible advantage is that the solar radio data are frequently easier to obtain than the optical data Acknowledgments are expressed to V V Zheleznyakov who read the manuscript of this paper and made a number of suggestions There are 12 figures and 25 references 5 Soviet and 20 non-Soviet The English-language references read as follows Ref 6 O Hachenberg H Volland.Z Astrophys 47 69 1959. Ref 7 quoted in text; Ref 18: T Obayashi Y Hakura J Radio Res Lab 7 27 1960. Ref 25 C M Minnis G H Bazzard J Atm Terr Phys 18 297 1960

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On the relation between sporadic S/141/61/004/005/002/021
E032/E314

ASSOCIATION Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete
(Scientific Research Radiophysics Institute of the Gor'kiy University)

SUBMITTED: March 8, 1961

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S/141/62/005/001/018/024
E140/E435

AUTHOR: ~~Getmantsev~~, G.G.

TITLE: On the origin of cosmic radio radiation and cosmic rays

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Radiofizika, v.5, no.1, 1962, 172-174

TEXT: This paper was presented at the Soviet-American Symposium on Radio Astronomy at Grim-Bank USA.
It is a brief review of the situation in cosmic ray research and concerns the discrepancies in knowledge and theory concerning point sources - supernovae - and the galactic halo. While Costain's measurements (Ref.3: Mont. Not. Roy. Astr. Soc., v.120, 1960, 248) are considered reliable, his value of α is too low due to the loss to synchrotron radiation of the energy of relativistic electrons. In any case, the spectral differences point to independence of the origins of cosmic radiation from the halo and the supernovae. Comparisons using high-directivity radiotelescopes (diagram width $\sim$50') carried out by V.A.Razin (Ref.4: Izv. vyssh. uch. zav. Radiofizika, v.3, 1960, 921) on the radiation of the flat subsystem and the halo immediately adjacent confirm this conclusion. At the same time these findings are in
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contradiction with the evidence available at the present time on the high degree of isotropicity of the primary cosmic rays. It appears necessary to accept a hypothesis of the diffusion character of motion of cosmic particles along magnetic flux lines. From this it should follow that the cosmic radiation in the halo is due only to the flat subsystem acting at the earliest stage of development of the galaxy. The author's considerations neglect the possible effects of regular and random motions of the magnetized gas masses. Substantial progress in the theory of the origin of nonthermal cosmic radio radiation and cosmic rays can be expected in the next few years.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Radiophysics Scientific Research Institute at Gor'kiy University)

SUBMITTED: October 7, 1961

40021
S/141/62/005/003/001/011
E032/E514

3.2410

AUTHOR: Getmantsev, G.G.

TITLE: On the diffusion of cosmic rays in the interstellar magnetic field

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v.5, no.3, 1962, 459-463

TEXT: In most published work the motion of cosmic-ray particles in the interstellar magnetic field is discussed on the "three-dimensional diffusion" approximation, in which it is assumed that the directions of the magnetic lines of force in the various quasi-uniform regions are randomly distributed. However, it was noted in a previous paper (Ref.2: Astronom. zh., 35, 722, 1958) that, owing to the presence of regions with enhanced field strength in the interstellar space, charged cosmic-ray particles may become reflected from such regions and return along the same tubes of force. In addition, the motion of these particles is affected by the presence of gas-magnetic discontinuities at which the particle may not be reflected and the motion may assume the nature of one-dimensional diffusion with a mean free path of the

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On the diffusion of cosmic rays ... S/141/62/005/003/001/011
E032/E514

same order of magnitude as the distance between the discontinuities measured along the lines of force. In this way the motion of charged particles may be represented by a model incorporating two types of motion, namely, one-dimensional diffusion with the above mean free path and three-dimensional diffusion associated with the random changes in the direction of the magnetic field. This model is used to derive an expression for the RMS displacement of a particle in interstellar space during a time t. It is estimated that after $t \sim 10^{17}$ sec the RMS displacement ... in fact $10^{..}$ ...

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of the Gor'kiy University)

SUBMITTED: November 2, 1961

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GETMANTSEV, G. G.; RAZIN, V. A.

Methods for measuring spatial variations in the cosmic radiation spectrum. Izv. vys. ucheb. zav.; radiofiz. 5 no.5:866-872 '62. (MIRA 15:10)

1. Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete.

(Cosmic rays—Spectra)

S/141/62/005/006/001/023
E032/E114

AUTHOR: Getmantsev, G.G.

TITLE: On the spectrum of nonthermal cosmic radio emission and the nature of the electron component of primary cosmic rays

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v.5, no.6, 1962, 1051-1056

TEXT: J.E. Baldwin (Report on the International Conference on Cosmic Rays, Japan, 1961) has reported that the exponent α in the frequency spectrum $I_f \sim f^{-\alpha}$ is a function of frequency. The aim of the present paper was to investigate possible reasons for this variation in α. It is shown that the change in α in the metre band cannot be explained by absorption of radio emission of ionised gas in cosmic space. Other mechanisms, which will not explain the effect either, are the ionisation and synchrotron energy losses and the production of relativistic electrons as a result of collisions between relativistic protons and the nuclei of particles making up the interstellar gas. However, if the cosmic electrons

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E032/E114

in the galactic corona were produced at some early stage in the existence of the galaxy rather than under steady-state conditions, then the energy distribution should in general be a function of time and the exponent α in the frequency distribution should be a function of frequency. Moreover, the order of magnitude for the change in α is found to be the same as that reported by Baldwin. There is 1 figure.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete
(Scientific Research Radiophysics Institute at Gor'kiy University)

SUBMITTED: January 27, 1962

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39536
S/033/62/039/004/002/008
E032/E514

3,2410 (also 2205, 2805)

AUTHOR: Getmantsev, G.G.

TITLE: On the isotropy of primary cosmic rays

PERIODICAL: Astronomicheskiy zhurnal, v.39, no.4, 1962, 607-610

TEXT: The motion of most cosmic-ray particles in interstellar magnetic fields is practically completely determined by the geometry of the interstellar magnetic field. In the present paper it is considered that the primary cosmic-ray sources are localised in the region of the galactic plane and that the direction of the magnetic field lines of force vary in a random fashion. Two cases are considered, namely:
1. The magnetic field is quasi-static so that its geometry is either time independent or, owing to the motion of the conducting interstellar gas, individual lines of force retain their identity during the lifetime of the galaxy. Cosmic-ray particles move along the field lines with a velocity of c/3, gradually departing from the galactic plane, and the motion of the particles can be approximated to by three-dimensional diffusion with an average mean free path of the same order of

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On the isotropy of primary cosmic rays S/033/62/039/004/002/008
E032/E514

magnitude as the characteristic dimensions of the magnetic field irregularities (10^{20} - 3 x 10^{20} cm). In addition to the effect associated with the random variation in the direction of lines of force, there is a one-dimensional diffusion effect in which the cosmic-ray particles move along given tubes of force and become reflected at discontinuities. A model involving a combination of the one-dimensional and three-dimensional diffusion, i.e. one-dimensional diffusion along lines of force and three-dimensional diffusion due to random breaks in the lines of force, is used to estimate the RMS displacement of the cosmic-ray particles. It is estimated that this displacement is of the order of 10^{22} cm after a time of about 10^{17} sec.

2. In this case the topology of the magnetic field is a function of time, owing to the fact that the tubes of force do not retain their individuality at gas-magnetic discontinuities and this should remove the original anisotropy in the cosmic-ray distribution. However, it is not possible at present to estimate this effect quantitatively. However, it is concluded that the diffusion mechanism discussed above is the most natural

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explanation of the cosmic-ray isotropy, since it yields a very low degree of anisotropy ($\delta \lesssim 10^{-3}$) without any special and far reaching assumptions.

ASSOCIATION: Radiofizicheskiy institut Gor'kovskogo gosudarstvennogo universiteta imeni N. I. Lobachevskogo (Radiophysical Institute, Gor'kiy State University imeni N. I. Lobachevskiy)

SUBMITTED: July 12, 1961

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44432
S/033/62/039/005/005/011
E032/E514

AUTHOR: Getmantsev, G.G.

TITLE: On the heating of interstellar gas by cosmic rays

PERIODICAL: Astronomicheskiy zhurnal, v.39, no.5, 1962, 856-861

TEXT: It is argued that the heating of interstellar gas due to ionization losses can only be effective at relatively high temperatures of the medium and can hardly be responsible for an increase in the temperature if the initial temperature is much less than 10^4 deg. This paper is concerned with a second possible mechanism which is effective provided the temperature is not too high. It is assumed that a cosmic-ray stream moves along randomly oriented magnetic lines of force. Owing to the high conductivity of the interstellar gas, the magnetic field due to the cosmic-ray stream cannot be produced in a short interval of time and the stream is almost completely compensated by electron currents in the interstellar plasma. The gas should then become heated owing to Joule losses. It is shown that these losses are given by $W_2^* = 3\ mc^2N^2/T^{3/2}$, where N is the cosmic-ray density, T is the temperature and m is the mass of the cosmic-

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ray particles. In deriving this expression it is assumed that the particle velocity is $v_2 = c/3$ and the conductivity of the interstellar gas is $\sigma \sim e^2 T^{3/2}/27$ m. These losses are then shown to be greater than the rate of emission of energy through recombinational processes so that the temperature of the gas should increase and this increase will continue until the two effects just balance each other. Detailed examination of this type of effect leads to the conclusion that cosmic rays cannot in fact ensure any appreciable heating of interstellar gas in those regions of the galaxy where the gas concentration is large ($n \sim 0.1$-$1\ cm^{-3}$) unless it is assumed that there are cosmic rays with $E/mc^2 \sim 0.1$-0.01 and $N \sim 10^{-4} - 10^{-5}\ cm^{-3}$. If, on the other hand, the gas density in the halo is of the order of 10^{-3} - $5 \times 10^{-4}\ cm^{-3}$ or if there are regions in which the concentration is of this magnitude, then primary cosmic rays might be able to heat the gas. If these conditions are satisfied and if the sources of cosmic rays ensure that the concentration of cosmic electrons with energies of $10^4 - 10^5$ eV is of the order of $3 \times 10^{-8}\ cm^{-3}$, then an interstellar medium with $n \sim 10^{-3}$-$5 \times 10^{-4}\ cm^{-3}$

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may become heated to a limiting temperature of a few million deg. If in addition the initial temperature is low, then in the initial stage of the heating process the latter should be due to the "induction" mechanism mentioned above and the temperature should rise to about 10^5 deg in a time interval of the order of 10^{12}-10^{13} sec.

ASSOCIATION: Radiofizicheskiy institut Gor'kovskogo gos. universiteta imeni N. I. Lobachevskogo (Radiophysics Institute of the Gor'kiy State University imeni N. I. Lobachevskiy)

SUBMITTED: May 5, 1961 (initially)
October 9, 1961 (after revision)

4

GETMANTSEV, G.G.; DENISOV, N.G.

One effect of measuring the electron concentration in the ionosphere by the antenna probe method. Geomag. i aer. 2 no.4:691-693 Jl-Ag '62. (MIRA 15:10)

1. Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom gosudarstvennom universitete.
(Ionospheric research)

S/141/62/005/006/001/023
E032/E114

AUTHOR: Getmantsev, G.G.

TITLE: On the spectrum of nonthermal cosmic radio emission and the nature of the electron component of primary cosmic rays

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v.5, no.6, 1962, 1051-1056

TEXT: J.E. Baldwin (Report on the International Conference on Cosmic Rays, Japan, 1961) has reported that the exponent α in the frequency spectrum $I_f \sim f^{-\alpha}$ is a function of frequency. The aim of the present paper was to investigate possible reasons for this variation in α. It is shown that the change in α in the metre band cannot be explained by absorption of radio emission of ionised gas in cosmic space. Other mechanisms, which will not explain the effect either, are the ionisation and synchrotron energy losses and the production of relativistic electrons as a result of collisions between relativistic protons and the nuclei of particles making up the interstellar gas. However, if the cosmic electrons

S/141/62/005/006/011/023
On the spectrum of nonthermal cosmic... E032/E114

in the galactic corona were produced at some early stage in the existence of the galaxy rather than under steady-state conditions, then the energy distribution should in general be a function of time and the exponent α in the frequency distribution should be a function of frequency. Moreover, the order of magnitude for the change in α is found to be the same as that reported by Baldwin. There is 1 figure.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute at Gor'kiy University)

SUBMITTED: January 27, 1962

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ACCESSION NR: AP4031627 S/0203/64/004/002/0243/0246

AUTHORS: Getmantsev, G. G.; Tokarev, Yu. V.

TITLE: Nonthermal galactic radio emission and the electronic component of cosmic rays in a nonstationary approximation

SOURCE: Geomagnetizm i aeronomiya, v. 4, no. 2, 1964, 243-246

TOPIC TAGS: radio astronomy, cosmic ray, cosmic ray electron component, relativistic cosmic electron, cosmic electron formation, cosmic electron energy spectrum, nonthermal galactic radio emission, nonthermal emission frequency spectrum

ABSTRACT: The steady-state model of relativistic cosmic electron formation is shown to be incompatible with recent radio-astronomical observations. A simple nonstationary model is proposed from which the electron energy spectrum is derived. It is assumed that the relativistic electrons are formed as a result of collisions between heavy cosmic particles and interstellar gas nuclei and, hence, have the same initial energy spectrum as the heavy particles producing them. It is further assumed that the heavy cosmic particles have a relict origin, i.e., they were formed during the youth of the galaxy. Only energy losses due to synchrotron

ACCESSION NR: AP4031627

radiation are considered in the computation of the electron energy spectrum (these losses predominate in the particle energy range of interest corresponding to nonthermal radio emission of wavelengths)

$$\lambda \leqslant 10\ \mu,$$

The effect on the form of the energy spectrum due to the limiting cases of the parameter

$$\alpha = T_\pi / T_e$$

is discussed, there T_π is the lifetime of the heavy cosmic particles forming the secondary relativistic electrons with a lifetime T_e. For

$$\alpha \to \infty$$

it is found that for sufficiently small T_e the electron energy spectrum coincides with that of the heavy particles. However, as T_e increases, the electron spectrum becomes steeper due to synchrotron losses. In the other limiting case

$$\alpha \to 0,$$

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ACCESSION NR: AP4031627

for sufficiently small T_{Π} the energy spectrum has a sharp discontinuity. As

$$T_n \to \infty,$$

(the steady-state model of relativistic electron formation), the bend completely disappears. From the energy spectrum for the relativistic electrons the frequency spectrum of their synchrotron radio emission can be found, having a similar form. The existing experimental data are not sufficiently reliable to compute estimates of the various parameters in the expressions for the electron energy spectrum. However, a bend in the frequency spectrum is observed, indicating that the steady-state model can not be correct. Orig. art. has: 4 equations.

ASSOCIATION: Radiofizicheskiy institut pri Gor'kovskom gosudarstvennon universitete (Radiophysics Institute of Gorkiy State University)

SUBMITTED: 15Sep62 DATE ACQ: 30Apr64 ENCL: 00

SUB CODE: AA NO REF SOV: 003 OTHER: 007

Card 3/3

L 5315-66 EWT(d)/FBD/FSS-2/EWT(l)/FS(v)-3/EEC(k)-2/EWA(d) AST/TT/RB/GS/GW/WS-2
ACCESSION NR: AT5023642 UR/0000/65/000/000/0581/0606

AUTHORS: Benediktov, Ye. A.; Getmantsev, G. G.; Mityakov, N. A.; Rapoport, V. O.; Sazonov, Yu. A.; Tarasov, A. F.

TITLE: Results of the intensity measurements of radio-frequency radiation at frequencies of 725 and 1525 kc by means of the apparatus installed in the satellite Elektron-2

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 581-606

TOPIC TAGS: artificial earth satellite, radio emission, ionosphere, atmospheric radiation, radio receiver, geomagnetic field

ABSTRACT: The results of radio-frequency measurements taken by the Elektron-2 satellite are analyzed and the equipment used is described. Two fixed-frequency receivers tuned to 725 and 1525 kc were used with a common dipole antenna. One side of the antenna was a 3.75-m metal stub, and the other side was the body of the satellite; the radiation resistance was 0.033 ohm for 725 kc and 0.146 ohm for 1525 kc for a capacitance of 46 pF. The receivers used straight amplification with 3 rf

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L 5315-66
ACCESSION NR: AT5023642 21

stages and 2 af stages. The error in the absolute value of the intensity of cosmic radio emission was ± 30% for 1525 kc and (+30, -50)% for 725 kc. The measurement results were processed by converting the output voltages to the effective temperature of radio emission. Values of effective temperature T_{eff} for a 2-hr flight near the apogee are given in Fig. 1 on the Enclosure, where the points correspond to 1525 kc and the crosses to 725 kc. All of the data on the spectrum of cosmic radio emission indicate that for f ≲ 3-5 Mc its intensity decreases with frequency. The profile of the electron concentration in the ionosphere was determined from its effect on radiation resistance and capacitance of the antenna. A graph of electron concentration N versus altitude h is shown in Fig. 2 on the Enclosure. Sporadic radio emission from the earth's atmosphere considerably exceeding the cosmic radio emission in intensity was recorded at both frequencies. A correlation between radio emission and the intensity of soft-electron flux is found. The distribution of radio emission indicates that electron fluxes penetrate the ionosphere primarily at latitudes of 30-50°. The authors thank Yu. V. Abramov, A. A. Andronov, B. N. Boykin, V. L. Ginsburg, V. V. Zheleznyakov, V. S. Karavanov, Yu. I. Logachev, G. A. Skuridin, and V. Yu. Trakhtengerts for aid in preparing the experiment and discussion of the results. Orig. art. has: 14 graphs, 1 diagram, 1 chart, 3 tables, and 11 formulas.

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L 5315-66
ACCESSION NR: AT5023642

2

ASSOCIATION: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva, Moscow (All-Union Conference on Space Physics)

SUBMITTED: 02Sep65 ENCL: 02 SUB CODE: ES, NP

NO REF SOV: 011 OTHER: 007

Card 3/5

L 5315-66
ACCESSION NR: AT5023642

ENCLOSURE: 01

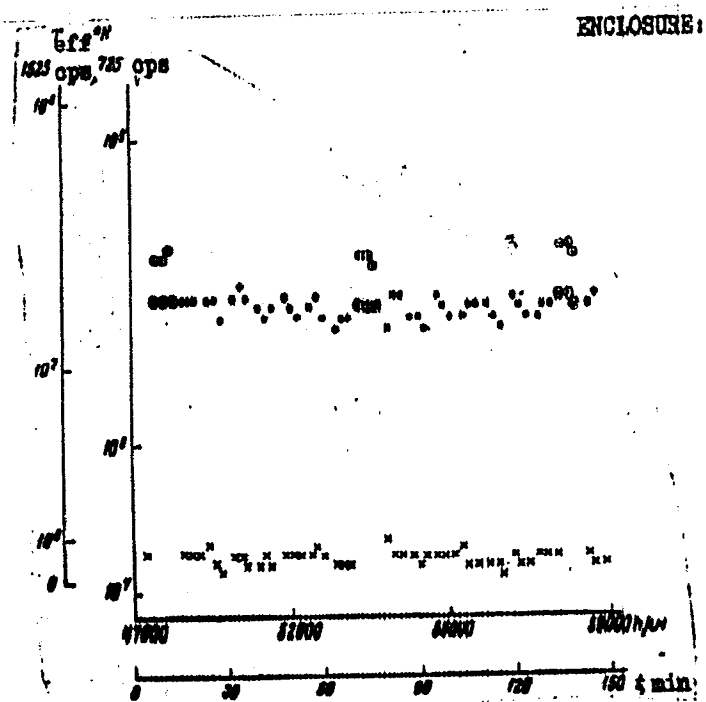

Fig. 1. Effective temperature versus time

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L 5315-66

ACCESSION NR: AT5023642

ENCLOSURE: 02

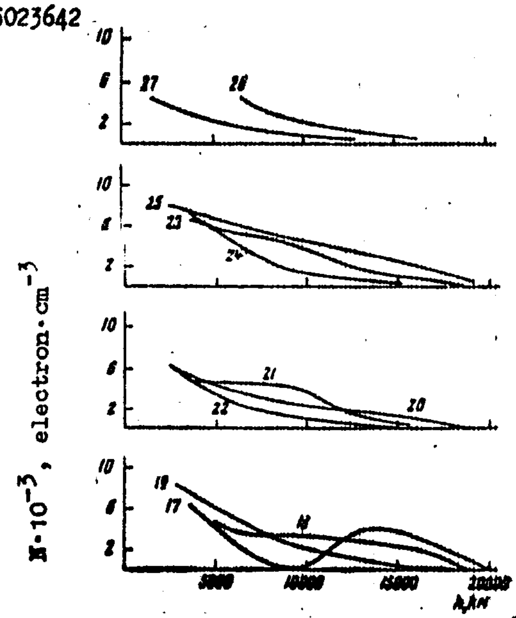

Fig. 2. Electron concentration versus altitude

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L 1322-66 FBD/FSS-2/EWT(1)/FS(v)-3/EWA(d) TT/GW/WS-4

ACCESSION NR: AP5021254 UR/0293/65/003/004/0614/0617

523.164.4:350.388.1:629.195.2

AUTHOR: Benediktov, Ye. A.; Getmantsev, G. G.; Sazonov, Yu. A.; Tarasov, A. F.

TITLE: Preliminary results of measurements of the intensity of distributed cosmic radio emission by the Elektron-2 satellite

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 4, 1965, 614-617

TOPIC TAGS: radio emission, cosmic ray intensity / Elektron 2

ABSTRACT: Preliminary results of measurements of the intensity of distributed cosmic radio emission conducted by Elektron-2 are presented. A 4-m rod antenna connected with two receivers was used in the measurements. The receivers operated at fixed frequencies of 725 and 1525 kc. Passbands were 3.9 kc at 725 kc and 7.4 kc at 1525 kc. Time constant of the output circuit was 1 sec. Some readings taken at the apogee (68,000 km) showed changes in cosmic radio emission levels with time; these were attributed to the spin of the satellite. Absolute values of the effective temperatures of the sky at 725 and 1525 kc were 3.2×10^7K and 1.2×10^7K, respectively. An increase in absolute effective temperature was noted with decreased frequency, and, conversely, radio emission intensity dropped with decreased frequency.

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L 1322-66

ACCESSION NR: AP5021254

Maximum emission was observed at latitudes of ±40°—50°. The intensity of distributed cosmic radio emission at 725 kc was 0.51×10^{-20} w m^{-2} cps^{-1} $sterad^{-1}$ and at 1525 kc, 0.87×10^{-20} w m^{-2} cps^{-1} $sterad^{-1}$. Orig. art. has: 3 figures. [PW]

ASSOCIATION: none

SUBMITTED: 16Jul64 ENCL: 00 SUB CODE: ES, EC

NO REF SOV: 002 OTHER: 002 ATD PRESS: 4105

Card 2/2

1965, 608-630

Card 1/2

GETMANTSEV, V. D., Candidate Phys-Math Sci (diss) -- "Some new approximate procedures for integrating differential equations". Kiev, 1959. 7 pp (Kiev State Pedagogical Inst im A. M. Gor'kiy, Chair of Math Analysis and Geometry) (KL, No 22, 1959, 107)

S/021/62/000/010/002/008
D251/D308

G
AUTHOR: ~~H~~etmantsev, V.D.

TITLE: The application of the method of alternate upper and lower approximations to systems of ordinary differential equations

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 10, 1962, 1286 - 1289

TEXT: The importance of the method of intermittent upper and lower approximations lies in the fact that at every stage of the calculation an estimate of the error may be found without recourse to special formulas. The author considers the work on this subject done by S.A. Chaplygin, B.N. Babkin, S.N. Slugin and K.V. Zadiraka,. and gives a method based on Zadiraka's ideas. The equations are $dy/dx = f(x, y)$, $0 \leq x \leq 1$, with the initial conditions $y(0) = y_0$. The vector $f(x, y)$ satisfies the conditions of Cauchy's theorem on the existence and uniqueness of the solution. There are no further limitations on $f(x, y)$. Using the usual vector-matrix notation, a recur-

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rence relationship is derived which gives the (n+1)th approximation in terms of the nth. It is proved (Theorem 1) that, under the given conditions, if the initial approximation is lower or upper to the solution of the system, then the subsequent approximations will be alternatively upper or lower. Sufficient conditions for monotonic convergence of the upper and lower approximations to the solution are given (Theorem 2).

ASSOCIATION: Kyyivs'kyy instytut narodnoho hospodarstva (Kiev Institute of National Economy)

PRESENTED: by Yu.O. Mytropol's'kyy, Academician

SUBMITTED: January 25, 1962